

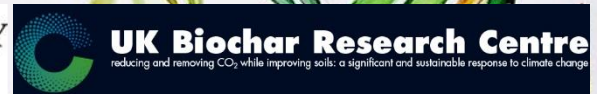
# A NEW ROTHC CARBON MODEL FOR BIOCHAR DECAY

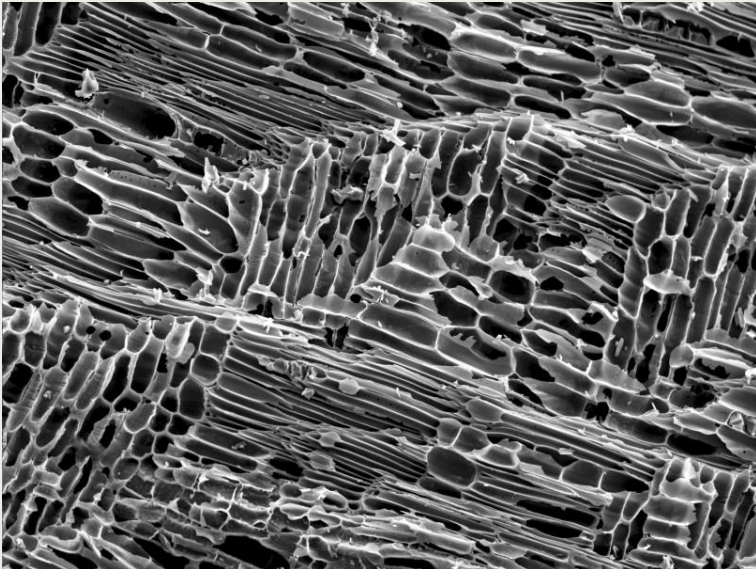
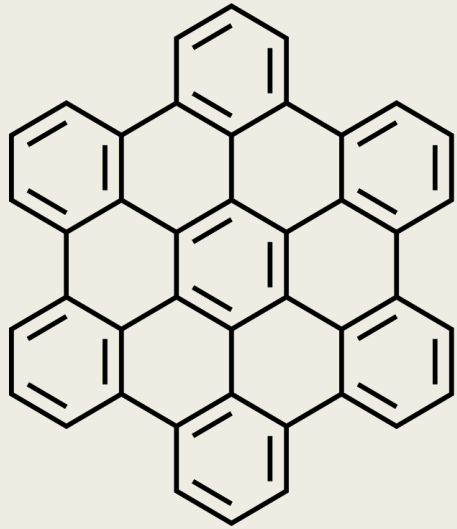
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## EGU 2020

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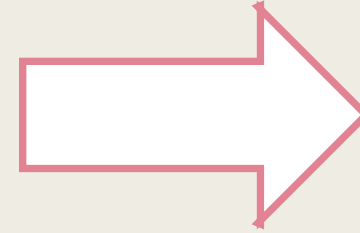


# Biochar

- Carbon capture of Carbon in plant residues
- Applied to agricultural fields with co-benefits (water, nutrients, bulk density...)
- Low cost
- High uncertainty in longevity and feedstock → our model
- Modelling will allow us to create strategies to maximise carbon storage, by optimising:
  - *Feedstocks*
  - *Climate*
  - *Crop systems*

# Modelling options

Biochar does not decay



Not true

IPCC  
(fixed value:  $0.80 \pm 11\%$  over 100 years)

Labile fraction and one pool model

1 / 2 / 3 biochar pool models



Which is the most accurate?

We compare three models using RothC:

- Single pool
- Two pools
- Three pools

## New methods

### BIOCHAR

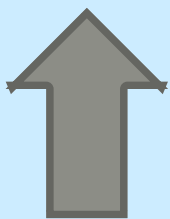
- Rate of decay
- Feedstock
- Partitioning between pools
- Monthly input

### RATE MODIFIERS

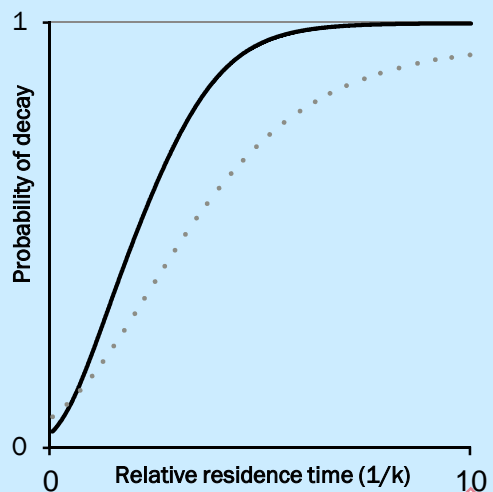
- Soil cover
- Temperature
- Rainfall

### PLANT INPUTS

- Above ground
- Below ground
- Ratio DPM/RPM\*



### CHEMICAL AGEING

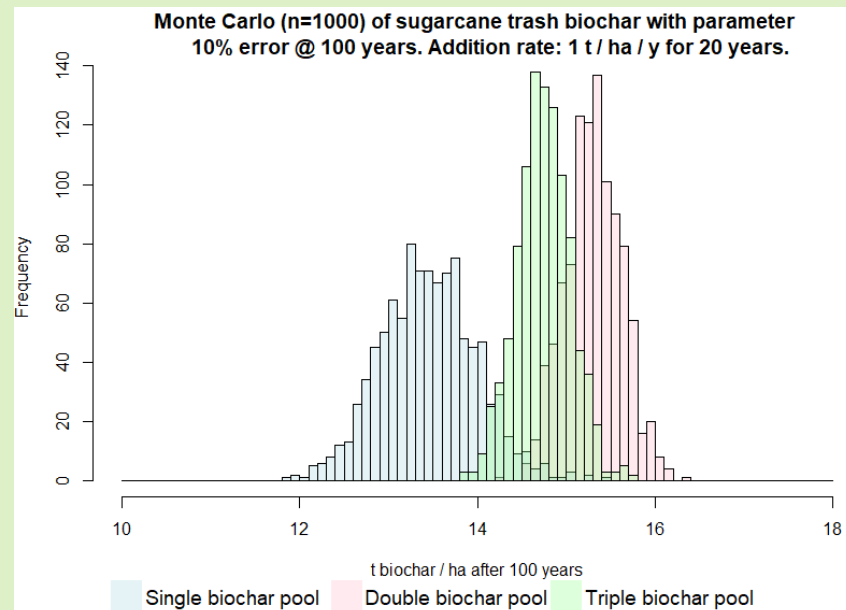


1 000 years

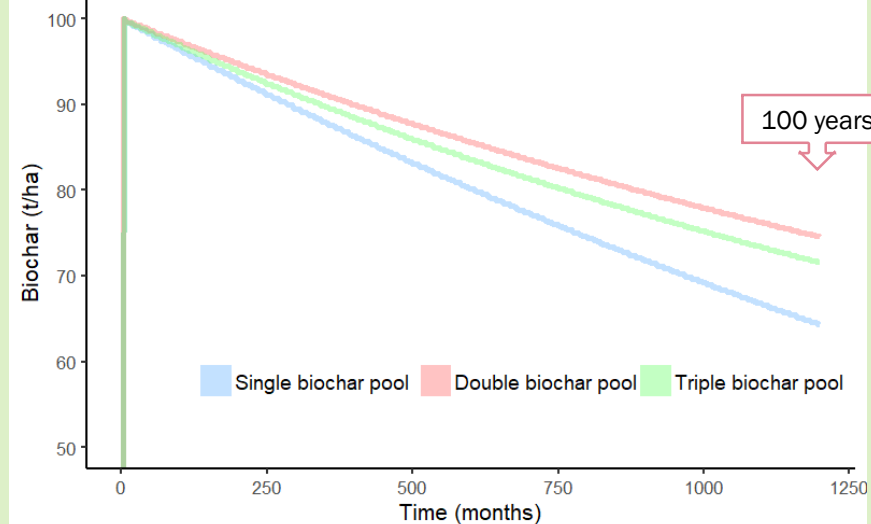
### ROTHC CARBON MODEL

\*DPM: Decomposable plant matter.  
RPM: Resistant plant matter.

## Results



### Decay patterns of 1 / 2 / 3 biochar pool RothC model for an initial addition of 100tC







# Results

- Technically:
  - *Two pools maximise accuracy while avoiding additional complexity*
  - *Verify calibration and publish chemical ageing methods*
  
- Aim to create a biochar model for any feedstock
  
- Ability to use biochar as a carbon sequestration tool in future thanks to certainty and strategies to store carbon